5

ENGINEERING CHANGE NOTICE

1. ECN 653817

Proj. ECN

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.	4. USQ Required?	5. Date
Supplemental [] Direct Revision [X] Change ECN [] Temporary [] Standby [] Supersedure [] Cancel/Void []	Juergen H. Rasmussen, Data Assessment and Interpretation, R2-12, 373-1128	[] Yes [X] No	05/26/99
	6. Project Title/No./Work Order No.	7. Bldg./Sys./Fac. No.	8. Approval Designator
	Tank 241-B-110	241-B-110	N/A
	9. Document Numbers Changed by this ECN (includes sheet no. and rev.)	10. Related ECN No(s).	11. Related PO No.
	HNF-SD-WM-ER-368, Rev. 1-B	ECNs: 635435, 635526, 649882	N/A

12a. Modification Work	12b. Work Package No.	12c. Modification Work Complete	12d. Restored to Original Condition (Temp. or Standby ECN only)
[] Yes (fill out Blk. 12b) [X] No (NA Blks. 12b, 12c, 12d)	N/A	N/A Design Authority/Cog. Engineer Signature & Date	N/A Design Authority/Cog. Engineer Signature & Date

13a. Description of Change 13b. Design Baseline Document? [] Yes [X] No

This ECN has been generated in order to update the document to reflect results of recent data/information evaluation.

Replace pages:
2-1, 2-2, 5-1, and 5-2

14a. Justification (mark one)

Criteria Change	[X]	Design Improvement	[]	Environmental	[]	Facility Deactivation	[]
As-Found	[]	Facilitate Const	[]	Const. Error/Omission	[]	Design Error/Omission	[]

14b. Justification Details

A tank characterization report page change revision is required to reflect the results of recent evaluation of data/information pertaining to adequacy of tank sampling for safety screening purposes (Reynolds et al. 1999, Evaluation of Tank Data for Safety Screening, HNF-4217, Rev. 0, Lockheed Martin Hanford Corporation, Richland, Washington).

15. Distribution (include name, MSIN, and no. of copies)

See attached distribution.

RELEASE STAMP

DATE: MAY 27 1999

STA: 4

HANFORD RELEASE

ID: 2

ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1) ECN-653817

16. Design Verification Required	17. Cost Impact				18. Schedule Impact (days)	
	ENGINEERING		CONSTRUCTION			
[] Yes	Additional	[] $	Additional	[] $	Improvement	[]
[X] No	Savings	[] $	Savings	[] $	Delay	[]

19. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 13. Enter the affected document number in Block 20.

SDD/DD	[]	Seismic/Stress Analysis	[]	Tank Calibration Manual	[]
Functional Design Criteria	[]	Stress/Design Report	[]	Health Physics Procedure	[]
Operating Specification	[]	Interface Control Drawing	[]	Spares Multiple Unit Listing	[]
Criticality Specification	[]	Calibration Procedure	[]	Test Procedures/Specification	[]
Conceptual Design Report	[]	Installation Procedure	[]	Component Index	[]
Equipment Spec.	[]	Maintenance Procedure	[]	ASME Coded Item	[]
Const. Spec.	[]	Engineering Procedure	[]	Human Factor Consideration	[]
Procurement Spec.	[]	Operating Instruction	[]	Computer Software	[]
Vendor Information	[]	Operating Procedure	[]	Electric Circuit Schedule	[]
OM Manual	[]	Operational Safety Requirement	[]	ICRS Procedure	[]
FSAR/SAR	[]	IEFD Drawing	[]	Process Control Manual/Plan	[]
Safety Equipment List	[]	Cell Arrangement Drawing	[]	Process Flow Chart	[]
Radiation Work Permit	[]	Essential Material Specification	[]	Purchase Requisition	[]
Environmental Impact Statement	[]	Fac. Proc. Samp. Schedule	[]	Tickler File	[]
Environmental Report	[]	Inspection Plan	[]		[]
Environmental Permit	[]	Inventory Adjustment Request	[]		[]

20. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number Revision
N/A		

21. Approvals

Signature	Date	Signature	Date
Design Authority		Design Agent	
Cog. Eng. J.H. Rasmussen	5/27/99	PE	
Cog. Mgr. K.M. Hall	5/27/99	QA	
QA		Safety	
Safety		Design	
Environ.		Environ.	
Other		Other	
		DEPARTMENT OF ENERGY	
		Signature or a Control Number that tracks the Approval Signature	
		ADDITIONAL	

Tank Characterization Report for Single-Shell Tank 241-B-110

Juergen H. Rasmussen
Lockheed Martin Hanford Corp., Richland, WA 99352
U.S. Department of Energy Contract 8023764-9-K001

EDT/ECN: ECN-653817 UC: 2070
Org Code: 74B20 CACN/COA: 102217/EI00
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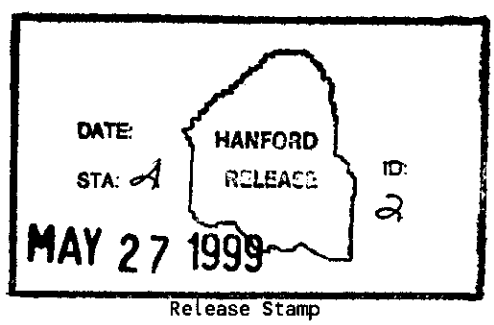
Abstract: N/A

5/27/99
Release Approval Date



Release Stamp

Approved for Public Release

RECORD OF REVISION	(1) Document Number HNF-SD-WM-ER-368	Page 1

(2) Title
Tank Characterization Report for Single-Shell Tank 241-B-110

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release	
		(5) Cog. Engr.	(6) Cog. Mgr. Date
0	(7) Initially released 09/06/94 on EDT-608061.	B.C. Simpson	C.S. Haller
1 RS	Incorporate per ECN-635435.	T.J. Kunthara 3/12/97	K.M. Hall 3/12/97
1-A RS	Incorporate per ECN-639586.	C.J. Benar 8/20/97	K.M. Hall 8/20/97
1B RS	Incorporate per ECN-649882	M.J. Kupfer 9-4-97	K.M. Hodgson 9-19-98
1-C RS	Incorporate per ECN-653817.	J.H. Rasmussen 5-7-99	K.M. Hall 5/27/97

2.0 RESPONSE TO TECHNICAL ISSUES

The following technical issues have been identified for tank 241-B-110 (Brown et al. 1996). The issues are as follows:

- **Safety Screening**: Does the waste pose or contribute to any recognized potential safety problems?

- **Vapor Screening**: 1) Are there flammable gases in the tank headspace above the 25 percent lower flammability limit (LFL)? 2) Does an organic solvent pool exist in the waste that may cause an organic solvent pool fire or ignition of organic solvents entrained in the waste solid?

In addition to the above issues, tank 241-B-110 was selected (Brown 1996) to be under the scope of Pretreatment (process testing sludge) Studies.

Data from the analysis of seven core samples retrieved in 1989, tank headspace flammability measurements taken in 1996, and historical information provide the means to respond to the safety screening issue.

Procedures used in the 1989 sampling and analyses effort are documented in the *Waste Characterization Plan for the Hanford Site Single-Shell Tanks* (Winters et al. 1990). Because the 1989 sampling of the tank 241-B-110 predated DQOs, a specific tank characterization plan or tank sampling and analysis plan was not prepared.

2.1 SAFETY SCREENING

The *Tank Safety Screening Data Quality Objective* (Dukelow et al. 1995) documents the requirements for screening waste and headspace in a tank for potential safety problems. These potential safety problems are exothermic conditions in the waste, criticality conditions in the waste, and flammable gases in the tank headspace.

The following sections address these safety problems and examine results from the August 1989 sample analysis of tank 241-B-110 with the current data requirements documented in the safety screening DQO. The safety screening DQO was not in effect during the time tank 241-B-110 was sampled and analyzed (see Appendix B). However, the sampling and analyses were sufficient to satisfy the safety screening requirements (Reynolds et al. 1999).

2.1.1 Exothermic Conditions (Energetics in the waste)

The first requirement of the safety screening DQO (Dukelow et al. 1995) was to ensure the concentration of exothermic constituents (organic or ferrocyanide) in tank 241-B-110 was too low to cause a safety hazard. The current safety screening DQO requires that the waste sample profile be tested for energetics every half segment (24 cm or 9.5 in.) to determine whether the energetics exceed the safety threshold limit. The threshold limit for energetics is 480 J/g of sample on a dry weight basis.

No exothermic reactions were observed in any composite samples during the differential scanning calorimetry (DSC) analyses. Because the current safety screening DQO was not in effect when tank 241-B-110 samples were analyzed, the samples were not analyzed for energetics in half segments. However, sampling and analyses were sufficient to satisfy safety screening (Reynolds et al. 1999).

Samples from the first segment were not used in making composite samples because of incomplete recovery of the first segment. No separate DSC analyses were done in first segments.

2.1.2 Criticality

Criticality screening is performed by measuring total alpha activity and assuming that all detected alpha is from ^{239}Pu. The safety threshold limit given in the safety screening DQO is 1 gram of ^{239}Pu per liter of waste. Using the bulk density (1.35 g/ml) of waste in tank 241-B-110, 1 g of ^{239}Pu per liter is equal to a total alpha activity of 46 μCi/g. Composites and some segments were analyzed for total alpha activity. Total alpha detected in all samples was well below the threshold limit. From composite analyses, the overall tank mean for total alpha activity was 0.155 μCi/g (equal to 0.0034 g of ^{239}Pu per liter). From segment analyses, the overall tank mean for total alpha activity was 0.160 μCi/g (equal to 0.0035 g of ^{239}Pu per liter). Therefore, criticality is not an issue for this tank.

2.1.3 Flammable Gas

The third potential safety problem in the tank is the presence of flammable gas in the tank headspace. Headspace gas measurements were taken in the field in April 1996. Results indicated no flammable gas was in the headspace (0 percent of the LFL).

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Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
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